

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.8.R.7 F.A. PROJ. SF-520036
 COUNTY LEE
 PROJECT DESCRIPTION _____

SITE DESCRIPTION BRIDGE ON SR-1162 (SHERIFF WATSON RD.)
OVER JUNIPER CREEK

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 DATE July 30, 2012

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

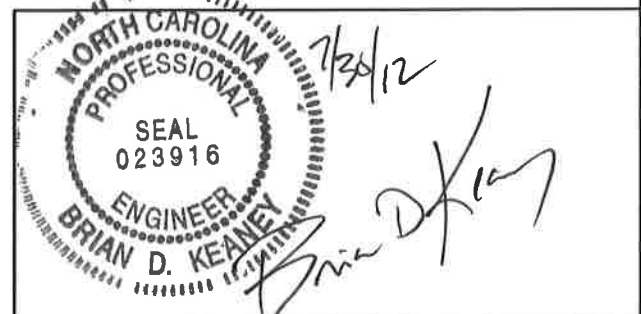
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

DRAWN BY: M. BATTEN



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

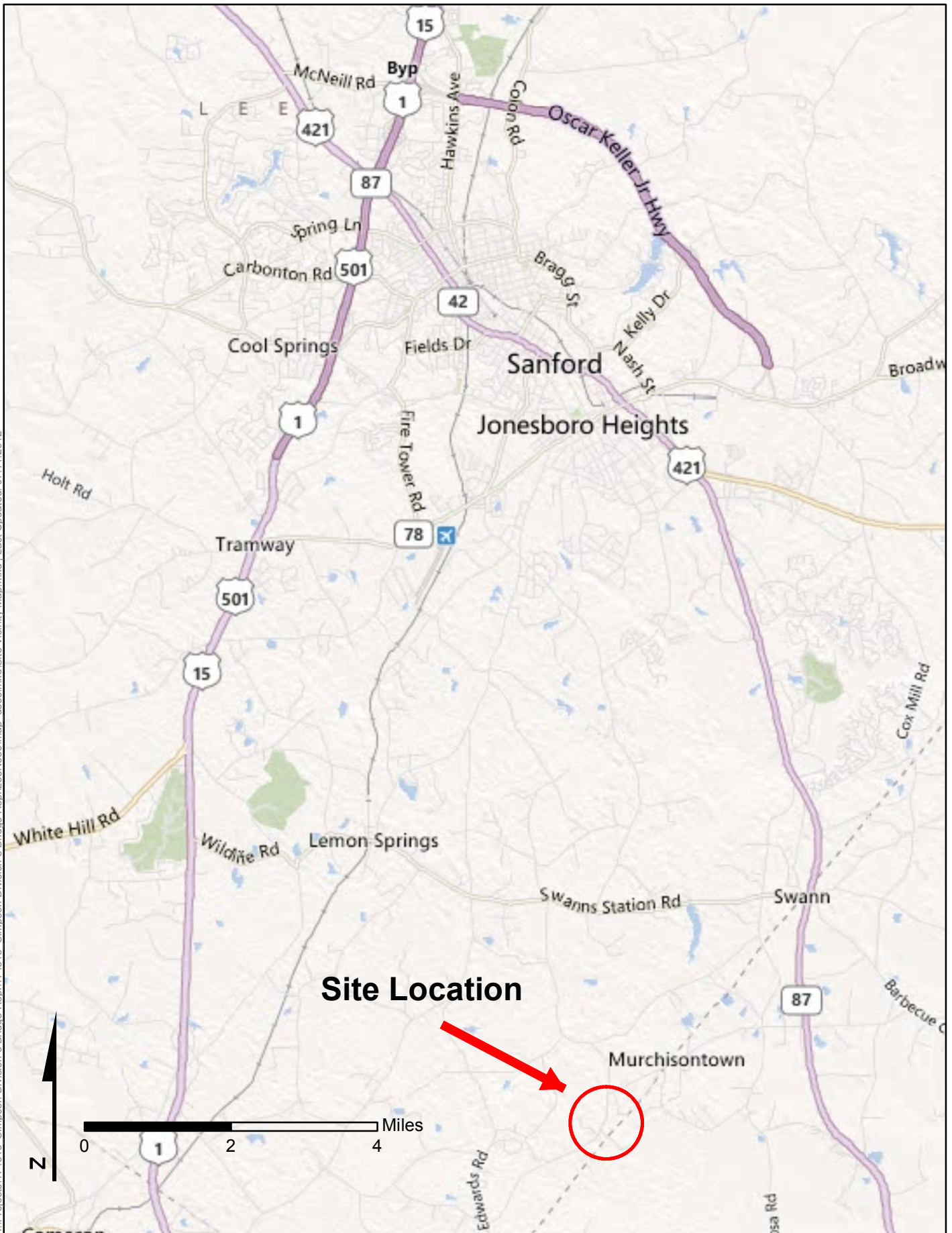
GEOTECHNICAL ENGINEERING UNIT

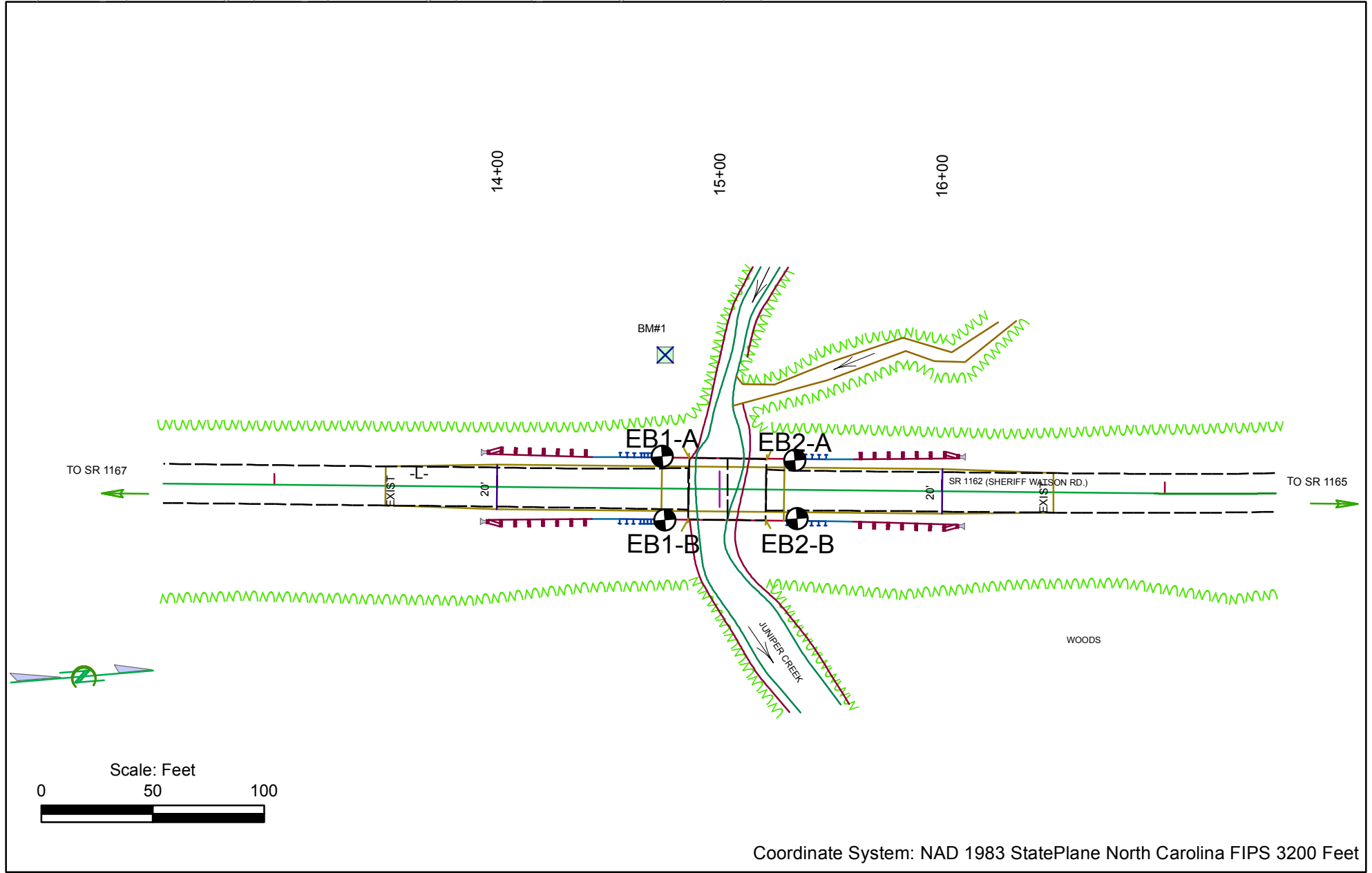
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION															
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.															
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS															
GENERAL CLASS.		GRANULAR MATERIALS (≤ 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS				MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.											
GROUP CLASS.	A-1		A-3		A-2		A-4		A-5		A-6		A-7		A-1, A-2 A-3		A-4, A-5 A-6, A-7								
SYMBOL																									
% PASSING	50 MX		30 MX		50 MX		51 MN		35 MX		35 MX		35 MX		36 MN		36 MN		36 MN						
LIQUID LIMIT	50 MX		30 MX		50 MX		51 MN		35 MX		35 MX		35 MX		36 MN		36 MN		36 MN						
PLASTIC INDEX	6 MX		NP		40 MX		41 MN		40 MX		41 MN		40 MX		41 MN		40 MX		41 MN						
GROUP INDEX	0		0		0		4 MX		8 MX		12 MX		16 MX		No MX										
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS, GRAVEL, AND SAND		FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND		SILTY SOILS		CLAYEY SOILS		SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS												
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD				FAIR TO POOR				FAIR TO POOR		POOR		UNSATURABLE												
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																									
CONSISTENCY OR DENSENESS										MINERALOGICAL COMPOSITION															
PRIMARY SOIL TYPE		COMPACTNESS OR CONSISTENCY		RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)		RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)																			
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)		VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE		<4 4 TO 10 10 TO 30 30 TO 50 >50		N/A																			
GENERALLY SILT-CLAY MATERIAL (COHESIVE)		VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD		<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30		0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4																			
TEXTURE OR GRAIN SIZE										COMPRESSIBILITY															
U.S. STD. SIEVE SIZE		4		10		40		60		200		270													
OPENING (MM)		4.76		2.00		0.42		0.25		0.075		0.053													
BOULDER (BLDR.)		COBBLE (COB.)		GRAVEL (GR.)		COARSE SAND (CSE. SD.)		FINE SAND (F. SD.)		SILT (SL.)		CLAY (CL.)													
GRAIN SIZE		MM 305 IN. 12		75 3		2.0		0.25		0.05		0.005													
SOIL MOISTURE - CORRELATION OF TERMS										PERCENTAGE OF MATERIAL															
SOIL MOISTURE SCALE (ATTERBERG LIMITS)				FIELD MOISTURE DESCRIPTION				GUIDE FOR FIELD MOISTURE DESCRIPTION																	
LL		LIQUID LIMIT		- SATURATED - (SAT.)				USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE																	
PL		PLASTIC LIMIT		- WET - (W)				SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE																	
OM		OPTIMUM MOISTURE		- MOIST - (M)				SOLID; AT OR NEAR OPTIMUM MOISTURE																	
SL		SHRINKAGE LIMIT		- DRY - (D)				REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE																	
PLASTICITY										GROUND WATER															
NONPLASTIC		PLASTICITY INDEX (PI)		DRY STRENGTH																					
LOW PLASTICITY		0-5		VERY LOW																					
MED. PLASTICITY		6-15		SLIGHT																					
HIGH PLASTICITY		16-25		MEDIUM																					
		26 OR MORE		HIGH																					
COLOR										MISCELLANEOUS SYMBOLS															
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		SOIL SYMBOL		ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT		INFERRED SOIL BOUNDARY		INFERRED ROCK LINE		ALLUVIAL SOIL BOUNDARY		DIP & DIP DIRECTION OF ROCK STRUCTURES		SOUNDING ROD	
										SPT		CPT		DMT		TEST BORING		SAMPLE DESIGNATIONS							
										SPT		CPT		DMT		TEST BORING		S - BULK SAMPLE							
										SPT		CPT		DMT		TEST BORING		SS - SPLIT SPOON SAMPLE							
										SPT		CPT		DMT		TEST BORING		ST - SHELBY TUBE SAMPLE							
										SPT		CPT		DMT		TEST BORING		RS - ROCK SAMPLE							
										SPT		CPT		DMT		TEST BORING		RT - RECOMPACT TRIAXIAL SAMPLE							
										SPT		CPT		DMT		TEST BORING		CBR - CALIFORNIA BEARING RATIO SAMPLE							
										SPT		CPT		DMT		TEST BORING									
										SPT		CPT		DMT		TEST BORING									
										SPT		CPT		DMT		TEST BORING									
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										SPT		CPT													

		PROJECT REFERENCE NO. 17BP.8.R.7		SHEET NO. 2A
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS				
ROCK DESCRIPTION			TERMS AND DEFINITIONS	
<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>			<p><u>ALLUVIUM (ALLUV.)</u> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p><u>AQUIFER</u> - A WATER BEARING FORMATION OR STRATA.</p> <p><u>ARENACEOUS</u> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p><u>ARGILLACEOUS</u> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p><u>ARTESIAN</u> - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p><u>CALCAREOUS (CALC.)</u> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p><u>COLLUVIUM</u> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p><u>CORE RECOVERY (REC.)</u> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><u>DIKE</u> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p><u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p><u>DIP DIRECTION (DIP AZIMUTH)</u> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p><u>FAULT</u> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p><u>FISSILE</u> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p><u>FLOAT</u> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p><u>FLOOD PLAIN (FP)</u> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p><u>FORMATION (FM.)</u> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p><u>JOINT</u> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p><u>LEDGE</u> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p><u>LENS</u> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p><u>MOTTLED (MOT.)</u> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p><u>PERCHED WATER</u> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p><u>RESIDUAL (RES.) SOIL</u> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p><u>ROCK QUALITY DESIGNATION (RQD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><u>SAPROLITE (SAP.)</u> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p><u>SILL</u> - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p><u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p><u>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</u> - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.</p> <p><u>STRATA CORE RECOVERY (SREC.)</u> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p><u>STRATA ROCK QUALITY DESIGNATION (SRQD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p><u>TOPSOIL (TS.)</u> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>	
WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.		
CRYSTALLINE ROCK (CR)		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.		
NON-CRYSTALLINE ROCK (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.		
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.		
WEATHERING				
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.			
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.			
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH, OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.			
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.			
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <u>IF TESTED, WOULD YIELD SPT REFUSAL</u>			
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <u>IF TESTED, YIELDS SPT N VALUES > 100 BPF</u>			
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, YIELDS SPT N VALUES < 100 BPF</u>			
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.			
ROCK HARDNESS				
VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.			
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.			
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.			
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.			
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.			
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.			
FRACTURE SPACING		BEDDING		
TERM	SPACING	TERM	THICKNESS	
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET	
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET	
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET	
CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET	
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET	
		THINLY LAMINATED	< 0.008 FEET	
INDURATION				
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.				
FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.			
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.			
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.			
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.			
		BENCH MARK: BM#1 STA 10+65.88 -BL- 46.84' RT RR SPIKE IN 15' BIRCH ELEVATION: 302.29 FT.		
		NOTES: -		

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NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 1 OF 1

WBS 17BP.8.R.7		TIP SF-520036		COUNTY Lee		GEOLOGIST Batten, M. (Field Professional)			
SITE DESCRIPTION Bridge No. 36 on SR 1162 (Sheriff Watson Rd.) over Juniper Creek						GROUND WTR (ft)			
BORING NO. EB1-B		STATION 14+76		OFFSET 14 ft RT		ALIGNMENT -L-			
COLLAR ELEV. 303.7 ft		TOTAL DEPTH 14.5 ft		NORTHING 587,223		EASTING 1,952,624			
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 75% 2/15/2011				DRILL METHOD Mud Rotary / 2-1/4" H.S. Augers		HAMMER TYPE Automatic			
DRILLER Tignor, D.		START DATE 07/02/12		COMP. DATE 07/02/12		SURFACE WATER DEPTH N/A			
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT		BLOWS PER FOOT		SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION
			0.5ft	0.5ft	0.5ft	0 25 50 75 100			
305									
	303.7	0.0	4	4	2				GROUND SURFACE 0.0
									ROADWAY EMBANKMENT
	300.2	3.5	2	1	1				301.2 Tan, fine to coarse silty SAND (A-2-4) 2.5
									ALLUVIAL
									Black, fine silty SAND (A-2-4), contains trace organics
	295.2	8.5	10	63	37/0.1				296.4 7.3
									RESIDUAL
	290.2	13.5							294.7 White and tan fine sandy SILT (A-4) 9.0
	289.2	14.5	100/0.4						WEATHERED ROCK
			60/0.0						Gray PHYLLITE
									289.2 14.5
									Boring Terminated with Standard Penetration Test Refusal at Elevation 289.2 ft on Non-Crystalline Rock (PHYLLITE)
NOTES: 1) Mud rotary methods used to a depth of 11.5'. 2) 2-1/4" HS Augers used from a depth of 11.5' to 14.5'. 3) Auger refusal @ EL 289.2'.									



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

SHEET 1 OF 1

WBS 17BP.8.R.7			TIP SF-520036			COUNTY Lee			GEOLOGIST Batten, M. (Field Professional)					
SITE DESCRIPTION Bridge No. 36 on SR 1162 (Sheriff Watson Rd.) over Juniper Creek									GROUND WTR (ft)					
BORING NO. EB2-A			STATION 15+34			OFFSET 13 ft LT			ALIGNMENT -L-					
COLLAR ELEV. 303.4 ft			TOTAL DEPTH 19.0 ft			NORTHING 587,283			EASTING 1,952,603					
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 75% 2/15/2011									DRILL METHOD 2-1/4" H.S. Augers			HAMMER TYPE Automatic		
DRILLER Tignor, D.			START DATE 07/02/12			COMP. DATE 07/02/12			SURFACE WATER DEPTH N/A					

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
305															
	303.4	0.0	2	3	1	4								GROUND SURFACE	0.0
														ROADWAY EMBANKMENT	
300	299.9	3.5	6	3	1									Tan brown, fine to coarse SAND (A-2-4), contains little silt	2.5
														ALLUVIAL	
														Tan gray fine to coarse silty SAND (A-2-4)	
295	294.9	8.5	5	9	9									RESIDUAL	6.8
														White fine sandy SILT (A-4), contains rock fragments	
290	289.9	13.5	23	77/0.3											
285	284.9	18.5												WEATHERED ROCK	14.0
	284.4	19.0												Gray PHYLLITE	
			60/0.0												
			60/0.0												
														NON-CRYSTALLINE ROCK	18.5
														Gray PHYLLITE	19.0
														Boring Terminated with Standard Penetration Test Refusal at Elevation 284.4 ft in Non-Crystalline Rock (PHYLLITE)	

NOTES:

- 1) Driller indicates harder drilling at a depth of 14'.
- 2) Auger refusal @ EL 284.4'.



SHEET 1 OF 1

NC DOT BORE SINGLE LEEN036.GPJ NC_DOT.GDT 7/30/12



FIELD SCOUR REPORT

WBS: 17BP.8.R.7 TIP: SF-520036 COUNTY: Lee

DESCRIPTION(1): Replacement of Maintenance Bridge No. 36 on Sheriff Watson Rd. (SR 1165) over Juniper Creek

EXISTING BRIDGE

Information from: Field Inspection X Microfilm _____ (reel _____ pos: _____)
Other (explain) Bridge Survey and Hydraulic Design Report

Bridge No.: 36 Length: 34.8 Total Bents: 3 Bents in Channel: 1 Bents in Floodplain: 2
Foundation Type: Abutment walls, timber piles with concrete bases

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: Moderate scour observed at south abutment wall

Interior Bents: Moderate scour observed (deepening and widening)

Channel Bed: Moderate scour observed in channel bed (deepening and widening)

Channel Bank: Moderate scour observed on south side

EXISTING SCOUR PROTECTION

Type(3): Vertical timbers under bridge deck and wing walls

Extent(4): Approximately 4 ft past edge of bridge on upstream and downstream sides

Effectiveness(5): Scour protection seems to be working

Obstructions(6): No obstructions evident

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.



Photo 1: Looking North along -L-



Photo 2: Looking South at EB1-A



Photo 3: Looking South at EB2-A



Photo 4: Looking Downstream (East) towards Bridge No. 36



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SR 1162 over Juniper Creek | SF-520036 | Lee County

Site Photos